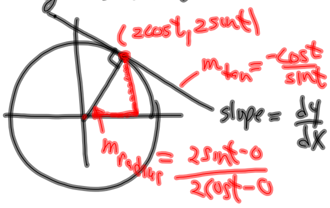
62 ave temp $y = 37\sin\left[\frac{2\pi}{365}(x-101)\right] + 25$

50. $x = 2\cos t$

$y = 2\sin t$

tan line $\perp$ radius



slope $= \frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}}$

Sep 24-7:18 AM

49. $x = t^2 + t \qquad y = \sin t$

a) $\frac{dy}{dx} = \frac{\cos t}{2t+1} \qquad \frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}}$

b) $\frac{d}{dt}\left(\frac{dy}{dx}\right) = \frac{d}{dt}\left(\frac{\cos t}{2t+1}\right) = \frac{-(2t+1)\sin t - \cos t \cdot 2}{(2t+1)^2}$

c) $\frac{d}{dx}\left(\frac{dy}{dx}\right) = \frac{d}{dx}\left(\frac{\cos t}{2t+1}\right) = \frac{\frac{-(2t+1)\sin t - 2\cos t}{(2t+1)^2}}{(2t+1)}$

$\frac{d}{dx}\left(\frac{dy}{dx}\right) = \frac{\frac{d}{dt}\left(\frac{dy}{dx}\right)}{\frac{dx}{dt}}$

d) $\frac{d^2y}{dx^2}$

Sep 24-8:14 AM

$f'(x) = \lim_{h\to 0} \frac{f(x+h) - f(x)}{h}$ formal definition of the derivative

$f(x) = x^2 + 2x$

find $f'(x)$ using the formal def. of derivative

$\lim_{h\to 0} \frac{(x+h)^2 + 2(x+h) - (x^2+2x)}{h}$

Sep 24-8:24 AM

equation of tan line at $x = a$ (given)

$y = f(x)$ (given)

$y = m(x - x_1) + y_1$

$y = f'(a)(x-a) + f(a)$

$\frac{d}{dx} x^n = nx^{n-1}$

$\frac{d}{dx} c x^n = c \cdot n x^{n-1}$

$\frac{d}{dx}[f(x) + g(x)] = f'(x) + g'(x)$

$\frac{d}{dx}[f(x)\cdot g(x)] = f(x)\cdot g'(x) + g(x) f'(x)$

$\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] = \frac{g(x) f'(x) - f(x) g'(x)}{[g(x)]^2}$

$\frac{d}{dx} f(g(x)) = g'(x) \cdot f'(g(x))$

$\frac{d}{dx} \sin x = \cos x$

$\frac{d}{dx} \cos x = -\sin x$

$\frac{d}{dx} \tan x = \sec^2 x$

$\frac{d}{dx} \cot x = -\csc^2 x$

$\frac{d}{dx} \sec x = \sec x \tan x$

$\frac{d}{dx} \csc x = -\csc x \cot x$

Sep 24-8:29 AM